## Abstract

A low-temperature NPP spent fuel reactor is disclosed, wherein the core is located in the core vessel and is fuelled by NPP spent fuel; a sealing cover and/or an air-tight shield are located on the top of the pool, forming at least one air shield. A pressurizer is set on the coolant inlet nozzle that improves the static pressure and maintains the pressure at the core outlet. On the side of the pool is an underwater handling canal, which is connected with the spent fuel storage pond. This invention uses NPP spent fuel as its nuclear fuel, promoting the utilization value of uranium resource, with good safety, economical and environmental effects. The radioactive gases discharged to environment during normal operation and under accident conditions can meet the requirements of "no radiological consequence". Its simplified handling process and equipment facilitate operation and improve safety. The reactor can be used for desalination, low-temperature heat supply and isotope production.